NON-NEONATAL TETANUS IN QUEBEC, CANADA, 1990-2008


1st National Immunization Conference Online
March 26-28 2012

Tetanus
Adult Immunization Surveillance
Epidemiology and immunization program

• Tetanus vaccine was first approved in Canada in 1940
• Since then the number of tetanus cases drastically declined:
  • 40-50 deaths per year in 1920
  • 1-10 case(s) per year at present, rarely fatal
• A universal immunization program was implemented in the province of Quebec (population 8 mln) in 1949 with recommended:
  • 4 doses of TDaP-Polio-Hib at 2, 4, 6 and 18 months
  • 1 Tdap-Polio dose at 4-6 years
  • 1 Tdap dose at 14-16 years
  • 1 booster dose every ten years or once at 50 years (Td, or one Tdap if ap not previously received)
## Current Post-Exposure Prophylaxis Prophylaxis protocol

<table>
<thead>
<tr>
<th>Minor wound without contamination</th>
<th>Other wounds&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vaccine</strong></td>
<td><strong>TIG&lt;sup&gt;2&lt;/sup&gt;</strong></td>
</tr>
<tr>
<td>Complete primary series with written proof</td>
<td>if last booster dose &gt; 10 years</td>
</tr>
<tr>
<td>≥ 3 vaccine doses</td>
<td></td>
</tr>
<tr>
<td>Unknown or incomplete primary series</td>
<td>Yes</td>
</tr>
<tr>
<td>&lt; 3 vaccine doses</td>
<td></td>
</tr>
</tbody>
</table>

1 Contaminated wound with dust, soil or animal/human feces, animal or human saliva; penetrating wound (like bites, rusty nails …) wounds associated with tissue injury and necrosis, chilblain or burn (Quebec Immunization Protocol, 2011)

2 Tetanus Immunoglobulin
Background and Objectives

• Sporadic cases of tetanus continue to occur in Quebec despite:
  • very high vaccine coverage against tetanus in children
  • recommendation for booster doses in adults

Objectives:

• Estimate the incidence of tetanus in Quebec
• Review its clinical presentation
• Identify risk factors associated with its occurrence
Methods

• Tetanus cases hospitalized between April 1st, 1990 and March 31st, 2008, identified from:
  • Provincial hospital discharge database (Med-Echo)
  • Notifiable disease registry (MADO)

• Diagnostic codes used:
  • ICD-9 code: 037 (tetanus)
  • ICD-10 codes: A34 (obstetrical tetanus), A35 (tetanus)

• Medical charts were reviewed by three independent reviewers. Consensus had to be reached to validate a case

• Information was collected with a standardized form
Number of cases and incidence of tetanus

- **Cases identified and reviewed:**
  - 36 potential cases identified
  - 23 confirmed as tetanus
    - 21 medical charts available for review
    - 2 confirmed cases upon other available documents

- **Incidence and case fatality:**
  - We observed an average of 1.3 cases/year and an incidence of 0.17 per million person-years
  - No cases occurred during winter months (Dec. Jan. and Feb.)
  - Two cases died (lethality of 8.6%)
  - Only 14 cases (61%) had been notified to the public health authorities

<table>
<thead>
<tr>
<th>Age (in year) at wound onset</th>
<th>Rate per 100 000 p-y</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20</td>
<td>0.3</td>
</tr>
<tr>
<td>20-34</td>
<td>2.5</td>
</tr>
<tr>
<td>35-49</td>
<td>1.2</td>
</tr>
<tr>
<td>50-64</td>
<td>3.1</td>
</tr>
<tr>
<td>65+</td>
<td>2.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1.7</strong></td>
</tr>
</tbody>
</table>
Age and sex distribution of cases

- Gender:
  - Both genders were affected
  - Men were younger at diagnosis
    - 39 vs. 54 years of age

- Age:
  - Median age was 42 years (range: 18 to 83y)
  - 62% of cases <60 years old
Potential sources of infection

- Potential source of infection were identified in 19/21 cases (90%)
- Of those 19 patients, 24 separate wounds were reported:
  - 7 chronic wounds (ulcers or skin lesions)
  - 17 traumatic injuries
    - 15 cases had at least one traumatic injury
- 9 cases sought medical care for their wound
- 2 cases with chronic wound were under medical care
- 3 cases developed tetanus during hospitalization
Circumstances of exposure

Circumstances of injury in tetanus cases:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Wounds n=24 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual labor</td>
<td>6 (25)</td>
</tr>
<tr>
<td>Wound involving rusty nail (no consultation)</td>
<td>2 (8,3)</td>
</tr>
<tr>
<td>Wound while traveling in foreign country</td>
<td>2 (8,3)</td>
</tr>
<tr>
<td>Accident involving motor-driven vehicle</td>
<td>2 (8,3)</td>
</tr>
<tr>
<td>Special situation involving fight and random shot</td>
<td>2 (8,3)</td>
</tr>
<tr>
<td>Skin diseases (herpes labialis, psoriasis, ulcers …)</td>
<td>7 (29,2)</td>
</tr>
<tr>
<td>Burn</td>
<td>2 (8,3)</td>
</tr>
<tr>
<td>Stomach surgery (among other wounds)</td>
<td>1 (4,2)</td>
</tr>
</tbody>
</table>

- The 2 cases without injury were especially questioned (at hospital) about gardening activities.
- One case was IDU
Immunization status of cases

- 81% of cases occurred in patients who were not up-to-date with their immunization
- 24% had never been immunized

Immunization status of tetanus cases, reported by sex and age group:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Total</th>
<th>Not registered in patient medical chart</th>
<th>Not vaccinated</th>
<th>No vaccine dose received in previous ten years (primary series completed or not)</th>
<th>Unknown primary series and less than 5 years since last vaccine dose</th>
<th>Complete primary series and more than 10 years since last vaccine dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;50 years</td>
<td></td>
<td>14.3</td>
<td>23.8</td>
<td>42.9</td>
<td>4.8</td>
<td>14.3</td>
</tr>
<tr>
<td>&lt;50 years</td>
<td></td>
<td>9</td>
<td>9</td>
<td>55</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td>9</td>
<td>18</td>
<td>45</td>
<td>9</td>
<td>18</td>
</tr>
</tbody>
</table>
Administration of TIG and vaccine

(see figure on following slide)

- 21 cases required ≥1 dose of vaccine and 18 needed tetanus immunoglobulin (TIG) as part of post-exposure prophylaxis
  - Only 38% received their vaccine & 22% their TIG at first medical consultation
    - 47% and 25% of those with at least one traumatic injury
    - 16% and 16% of cases with chronic wound or no wound at all
  - TIG were given very quickly after a tetanus was suspected
    - But in average 7 +/- 6 days after symptoms onset (median = 4.5 days)
- When discharged from the hospital
  - all cases had received TIG
  - 2 individuals (10%) have not received the needed vaccine dose
# Administration of TIG and vaccine

<table>
<thead>
<tr>
<th>Event</th>
<th>TIG</th>
<th>Vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wound onset</td>
<td>0 n=12</td>
<td>0 n=15</td>
</tr>
<tr>
<td>First medical consultation</td>
<td>24 n=21</td>
<td>25 n=15</td>
</tr>
<tr>
<td>First hospitalized day with symptoms</td>
<td>38 n=21</td>
<td>47 n=15</td>
</tr>
<tr>
<td>Hospital discharge</td>
<td>100 n=21</td>
<td>100 n=15</td>
</tr>
</tbody>
</table>

- **All cases (including cases with chronic wound or no wound at all)**
- **Cases with at least one traumatic injury**
Strengths and Limits

- We make an exhaustive census of tetanus cases
  - Combination & validation of notified and hospitalized cases
  - Review of medical charts

- There was some missing information in the medical charts reviewed: immunization status, date of injury etc...

- Exact source of infection is difficult to identify as several cases presented multiple potential sources
Highlights

• We identified areas of concern at every steps of care
  • Most patients were not adequately immunized
  • Many failed to seek medical care
  • Most patients were not adequately prescribed post-exposure prophylaxis (PEP)
    • There was several cases with chronic wounds or without wound at all
    • PEP seemed to be better applied to patients with traumatic injuries
    • Tetanus should not be excluded in wound absence
Conclusion

• National Public Health Program Objective:
  • < 1 tetanus case / 5 year: Not yet achieved
• Recommendations may be issued, taking into account:
  • Risk factors for developing tetanus
  • Definition of high risk wounds for post-exposure prophylaxis: chronic vs traumatic
  • Physician awareness for suspicion of tetanus and PEP compliance
  • Cost-effectiveness of different vaccination strategies to enhance vaccine coverage
Acknowledgments and investigation team

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